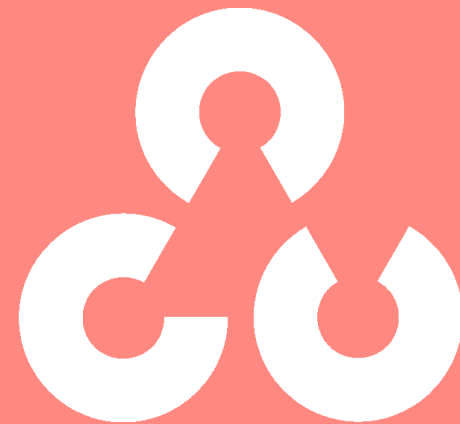
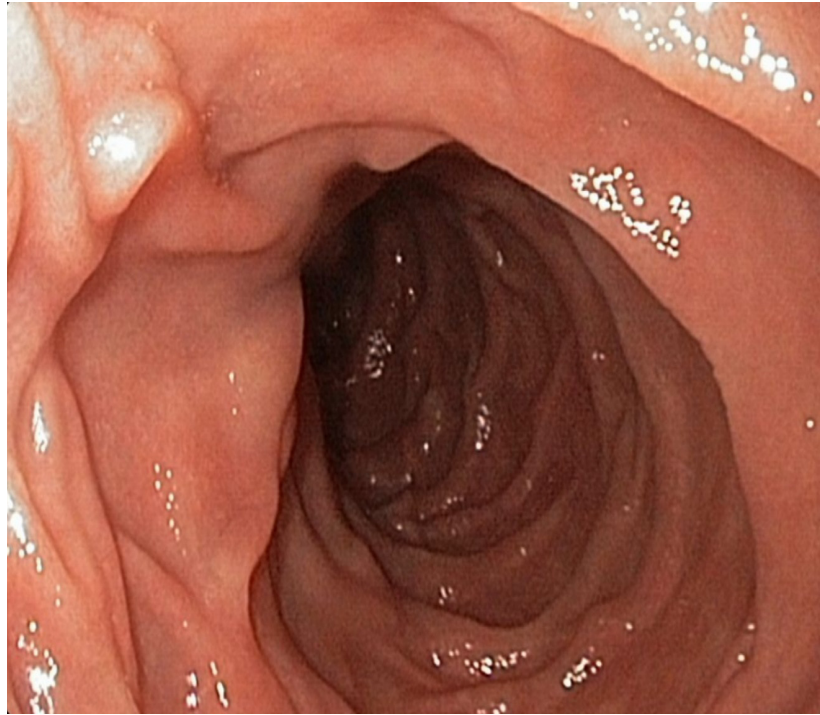




# OPENCV

— Detecção de Texturas —

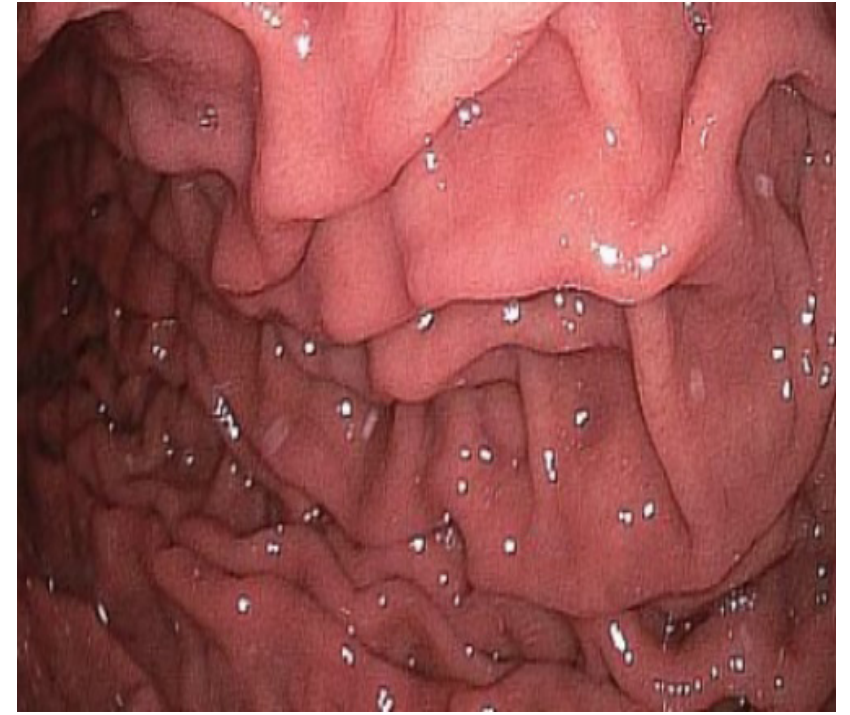
# OBJETIVO



DUODENO

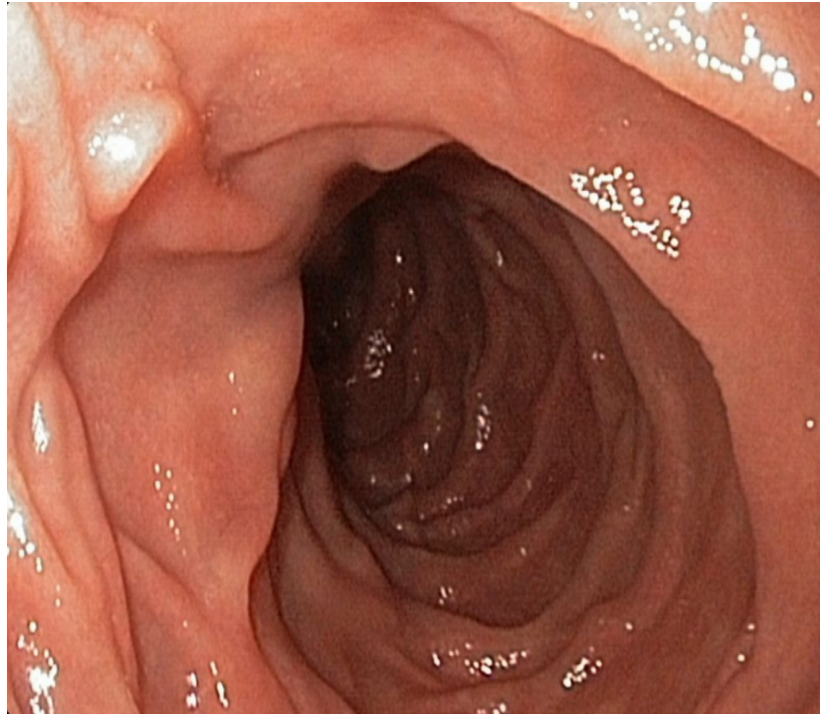


ESÓFAGO



ESTÓMAGO

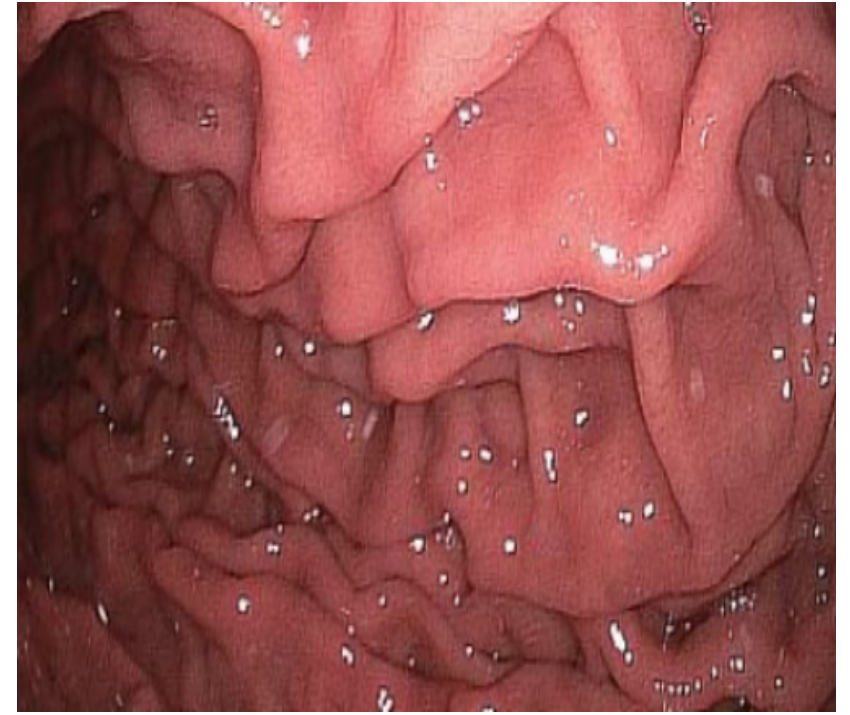
# OBJETIVO



**DUODENO**



**ESÓFAGO**



**ESTÔMAGO**

# ABORDAGEM

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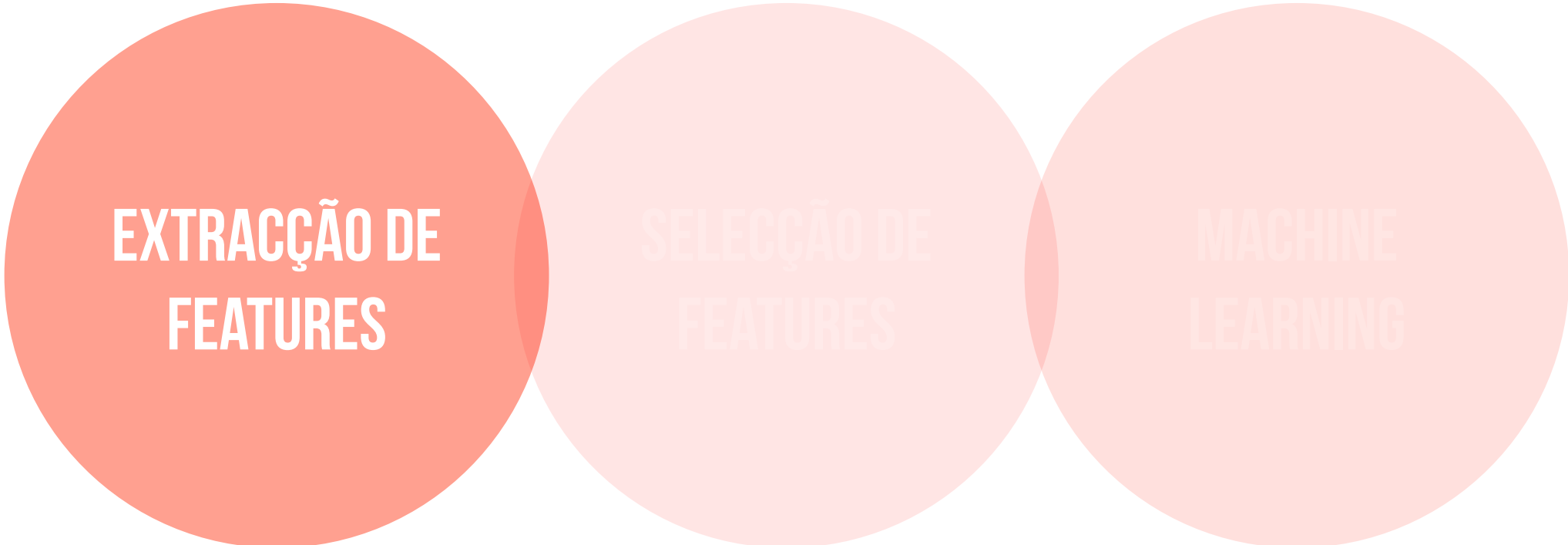


Diagram illustrating the approach (ABORDAGEM) to machine learning, consisting of three sequential steps represented by overlapping circles:

**EXTRACÇÃO DE  
FEATURES**

SELECÇÃO DE  
FEATURES

MACHINE  
LEARNING

# ABORDAGEM

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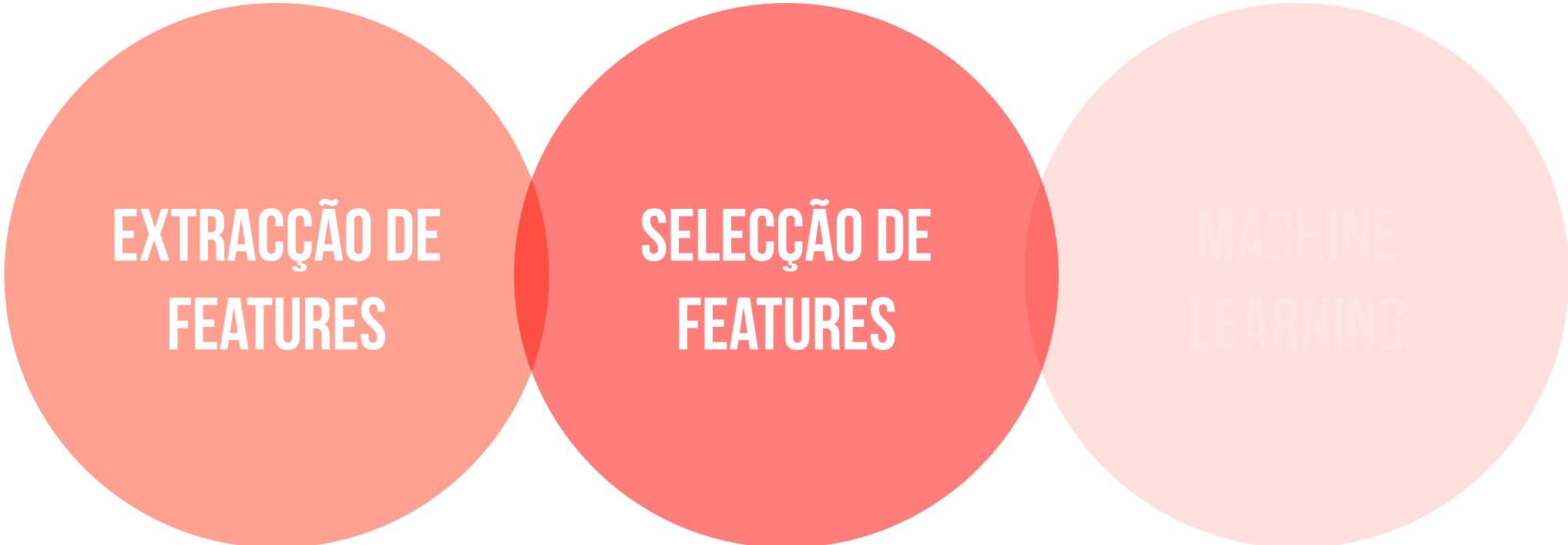


Diagram illustrating the approach (ABORDAGEM) to machine learning, showing three sequential steps represented by overlapping circles:

EXTRACÇÃO DE  
FEATURES

SELECÇÃO DE  
FEATURES

MACHINE  
LEARNING

# ABORDAGEM

---

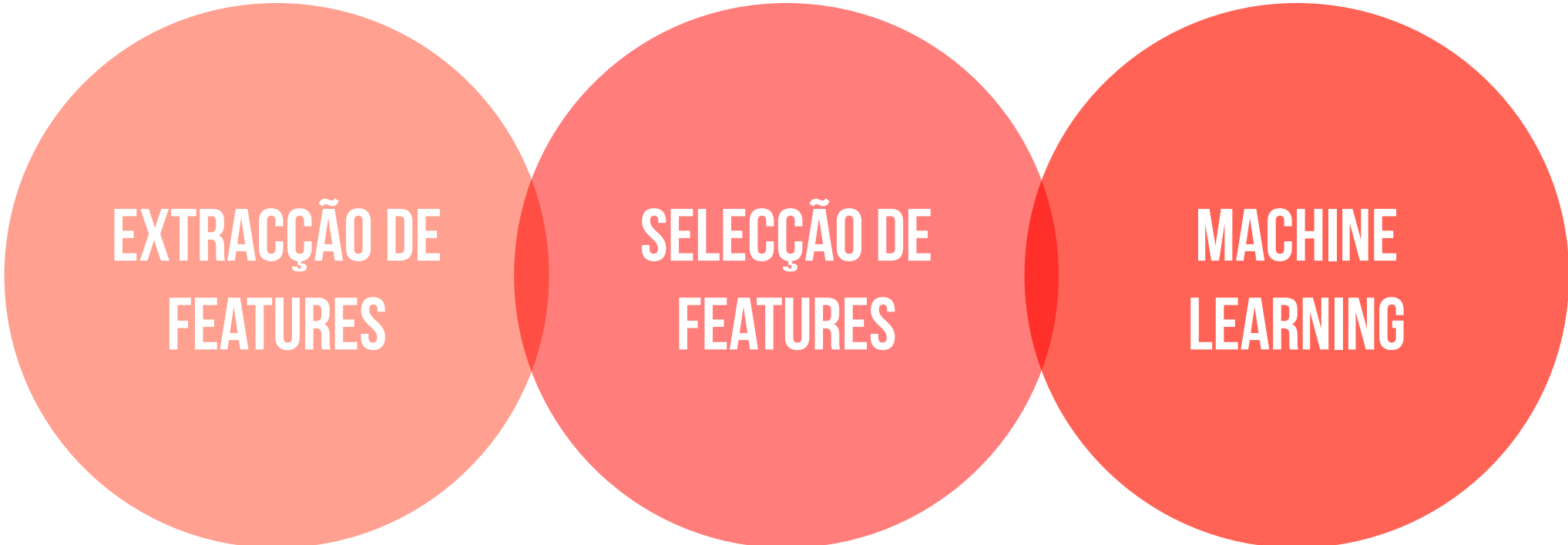


Diagram illustrating the approach (ABORDAGEM) to machine learning, consisting of three sequential steps represented by overlapping circles:

1. **EXTRACÇÃO DE FEATURES**

2. **SELECÇÃO DE FEATURES**

3. **MACHINE LEARNING**



# EXTRACÇÃO DE FEATURES

## GRAY LEVEL CO-OCCURRENCE MATRIX

|   |   |   |   |
|---|---|---|---|
| 0 | 0 | 1 | 2 |
| 0 | 2 | 2 | 3 |
| 2 | 3 | 3 | 2 |
| 1 | 1 | 2 | 3 |

MATRIZ CINZENTOS



| $i/j$ | 0         | 1         | 2         | 3         |
|-------|-----------|-----------|-----------|-----------|
| 0     | $\#(0,0)$ | $\#(0,1)$ | $\#(0,2)$ | $\#(0,3)$ |
| 1     | $\#(1,0)$ | $\#(1,1)$ | $\#(1,2)$ | $\#(1,3)$ |
| 2     | $\#(2,0)$ | $\#(2,1)$ | $\#(2,2)$ | $\#(2,3)$ |
| 3     | $\#(3,0)$ | $\#(3,1)$ | $\#(3,2)$ | $\#(3,3)$ |

MATRIZ OCORRÊNCIA

# EXTRACÇÃO DE FEATURES

## GRAY LEVEL CO-OCCURRENCE MATRIX

|   |   |   |   |
|---|---|---|---|
| 0 | 0 | 1 | 2 |
| 0 | 2 | 2 | 3 |
| 2 | 3 | 3 | 2 |
| 1 | 1 | 2 | 3 |

MATRIZ CINZENTOS



| <i>ij</i> | 0      | 1      | 2      | 3      |
|-----------|--------|--------|--------|--------|
| 0         | #(0,0) | #(0,1) | #(0,2) | #(0,3) |
| 1         | #(1,0) | #(1,1) | #(1,2) | #(1,3) |
| 2         | #(2,0) | #(2,1) | #(2,2) | #(2,3) |
| 3         | #(3,0) | #(3,1) | #(3,2) | #(3,3) |

MATRIZ OCORRÊNCIA

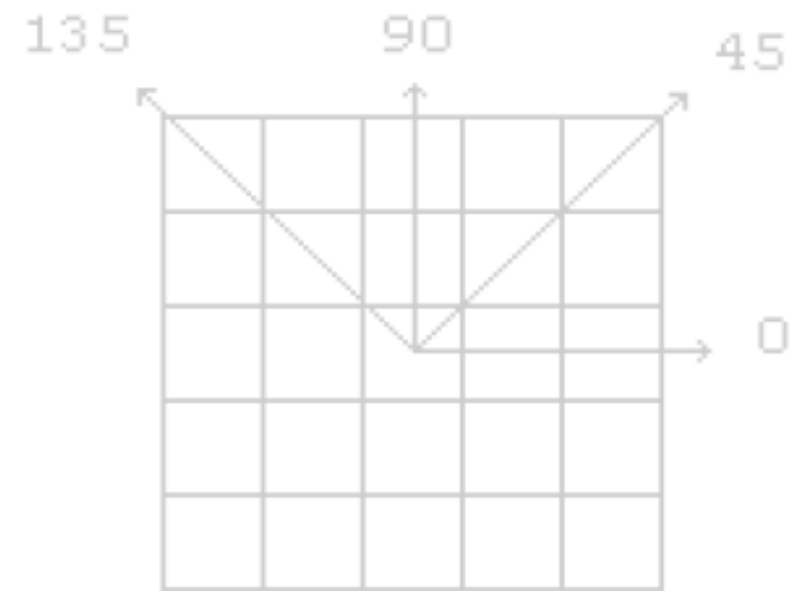


# EXTRACÇÃO DE FEATURES

## GRAY LEVEL CO-OCCURRENCE MATRIX

|   |   |   |   |   |
|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 |
| 2 | 1 | 1 | 1 | 2 |
| 2 | 1 | p | 1 | 2 |
| 2 | 1 | 1 | 1 | 2 |
| 2 | 2 | 2 | 2 | 2 |

DISTÂNCIA



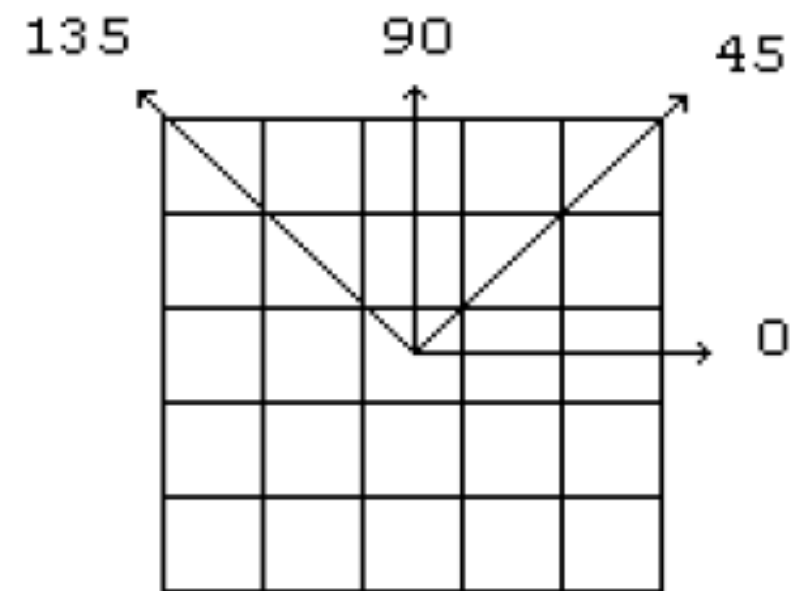
DIRECÇÃO

# EXTRACÇÃO DE FEATURES

## GRAY LEVEL CO-OCCURRENCE MATRIX

|   |   |   |   |   |
|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 |
| 2 | 1 | 1 | 1 | 2 |
| 2 | 1 | p | 1 | 2 |
| 2 | 1 | 1 | 1 | 2 |
| 2 | 2 | 2 | 2 | 2 |

**DISTÂNCIA**



**DIRECÇÃO**

# EXTRACÇÃO DE FEATURES

## GRAY LEVEL CO-OCCURRENCE MATRIX

|   |   |   |   |
|---|---|---|---|
| 2 | 1 | 1 | 0 |
| 1 | 2 | 2 | 0 |
| 1 | 2 | 2 | 4 |
| 0 | 0 | 4 | 2 |

$0^{\circ}$

|   |   |   |   |
|---|---|---|---|
| 2 | 0 | 0 | 0 |
| 0 | 0 | 1 | 2 |
| 0 | 1 | 6 | 1 |
| 0 | 2 | 1 | 2 |

$45^{\circ}$

|   |   |   |   |
|---|---|---|---|
| 2 | 0 | 2 | 0 |
| 0 | 0 | 2 | 1 |
| 2 | 2 | 0 | 6 |
| 0 | 1 | 6 | 0 |

$90^{\circ}$

|   |   |   |   |
|---|---|---|---|
| 0 | 0 | 2 | 1 |
| 0 | 0 | 1 | 1 |
| 2 | 1 | 2 | 2 |
| 1 | 1 | 2 | 2 |

$135^{\circ}$

# EXTRACÇÃO DE FEATURES

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## GLCM FEATURES

SUM VARIANCE

ANGULAR SECOND MOMENT

SUM ENTROPY

CONTRAST

ENTROPY

CORRELATION

DIFFERENCE VARIANCE

SUM OF SQUARES

DIFFERENCE ENTROPY

INVERSE DIFFERENCE MOMENT

IM OF CORRELATION

SUM AVERAGE

MAX CORRELATION COEFFICIENT

# EXTRACÇÃO DE FEATURES

## COLOR MOMENT FEATURES

|                    |
|--------------------|
| MEAN               |
| STANDARD DEVIATION |
| ENTROPY            |
| SKEWNESS           |

|   |   |    |
|---|---|----|
| R | H | Y  |
| G | S | CB |
| B | V | CR |

# EXTRACÇÃO DE FEATURES

## COLOR MOMENT FEATURES

|                    |
|--------------------|
| MEAN               |
| STANDARD DEVIATION |
| ENTROPY            |
| SKEWNESS           |

|   |   |    |
|---|---|----|
| R | H | Y  |
| G | S | CB |
| B | V | CR |

# EXTRACÇÃO DE FEATURES

## COLOR MOMENT FEATURES

|                    |
|--------------------|
| MEAN               |
| STANDARD DEVIATION |
| ENTROPY            |
| SKEWNESS           |

|   |   |    |
|---|---|----|
| R | H | Y  |
| G | S | CB |
| B | V | CR |



# EXTRACÇÃO DE FEATURES

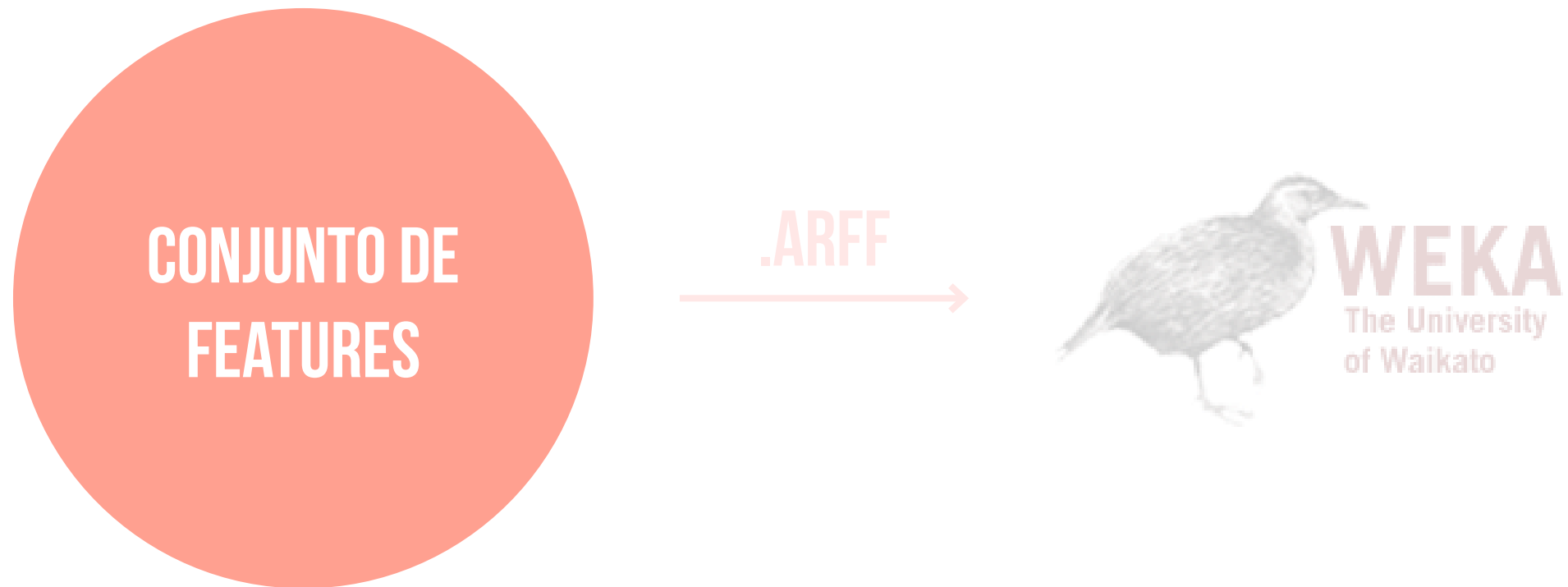
## COLOR MOMENT FEATURES

|                    |
|--------------------|
| MEAN               |
| STANDARD DEVIATION |
| ENTROPY            |
| SKEWNESS           |

|   |   |    |
|---|---|----|
| R | H | Y  |
| G | S | CB |
| B | V | CR |

# SELECÇÃO DE FEATURES

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# SELECÇÃO DE FEATURES

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CONJUNTO DE  
FEATURES

.ARFF



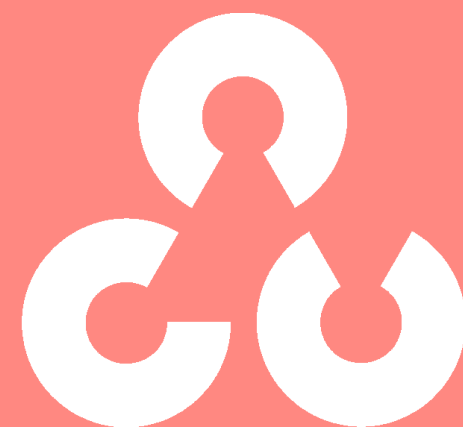
**WEKA**  
The University  
of Waikato

# MACHINE LEARNING

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SVP



**FIM**